Sumter **U**rban **A**rea **T**ransportation **S**tudy

Metropolitan **P**lanning **O**rganization

SUATS Safety Data Review Report

2011-2014

Allan Yu, SUATS MPO Manager

June, 2016

Introduction

This report is a summary of a SCDOT staff's presentation for the Highway Safety Program on June 1, 2016 to stakeholders in Sumter.

The incident data collected is from calendar year of 2011 to 2014. Traffic related incidents recorded in police reports are used for detail analysis. Each incident may involve one or more vehicle or pedestrian or bicyclist in each incident report. However, the occurrence of the accident is counted as one incident, **not** by the number of vehicles or passengers or drivers involved. Thus, one incident may have 3 injuries in a two-vehicle collision accident.

The operation manual used by the SCDOT for analysis is USDOT FHWA (Federal Highway Administration) *Highway Safety Improvement Program (HSIP) Manual.* The Manual categorizes several project analysis areas range from various areas such as road departure analysis to intersections analysis to access management analysis. Each category will assemble the crash data into the specific category of the same nature. Thus, each category may have different total number of crashes.

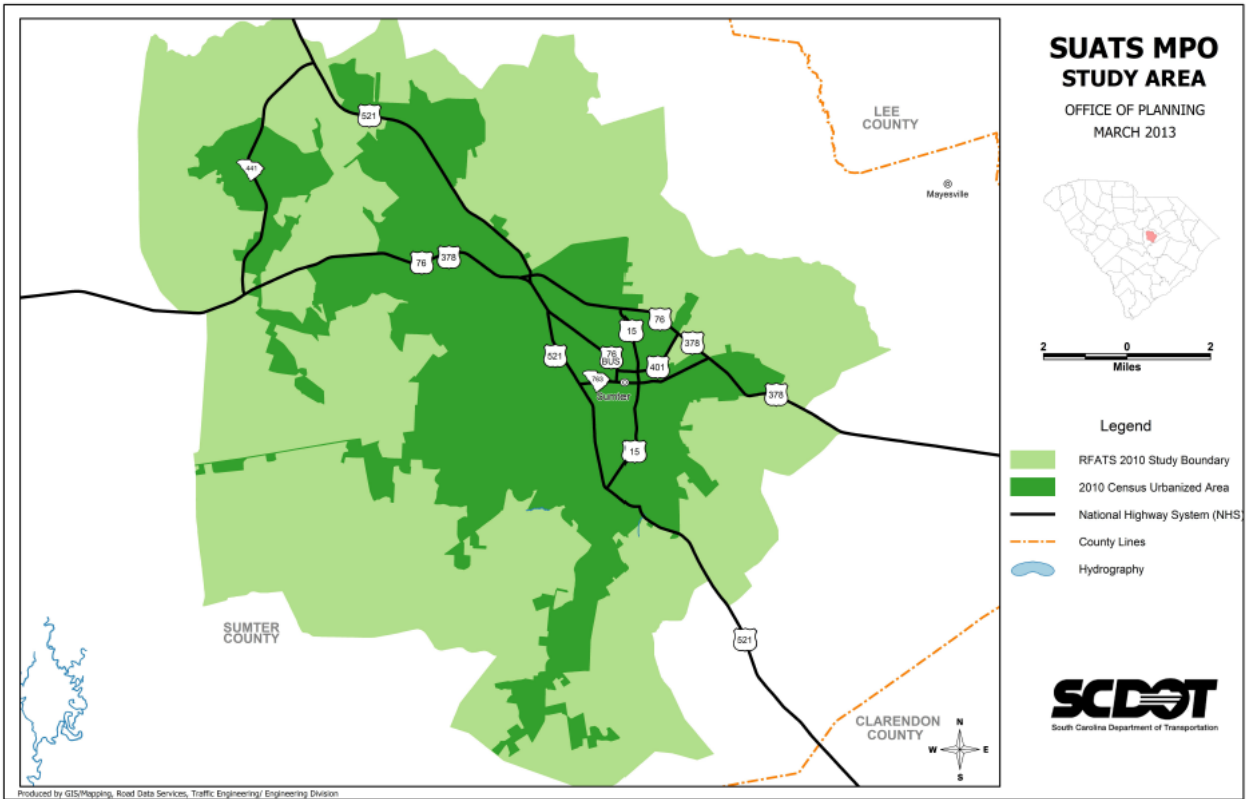
Source of Data and Analysis

SCDOT Highway Safety Program has received federal funding and has a SFY 2016 budget of $42.3 million dollars. The program purpose is to achieve a significant reduction in traffic fatalities and serious injuries on public roads.

The Highway Safety Improvement Program (HSIP) is a comprehensive accident data analysis system that collects all major roadways incidents in South Carolina whether there were fatalities or not. SUATS is included in the analysis.

SUATS MPO Study Area

Sumter Urban Area Transportation Study (SUATS) area is larger than the City of Sumter but smaller than the County of Sumter. The Study area is determined by the 2010 Census urbanized populated clusters. The map shown below is the boundary of the Study area and all crash data occurred between 2011 and 2014 was collected within the Study area for analysis.

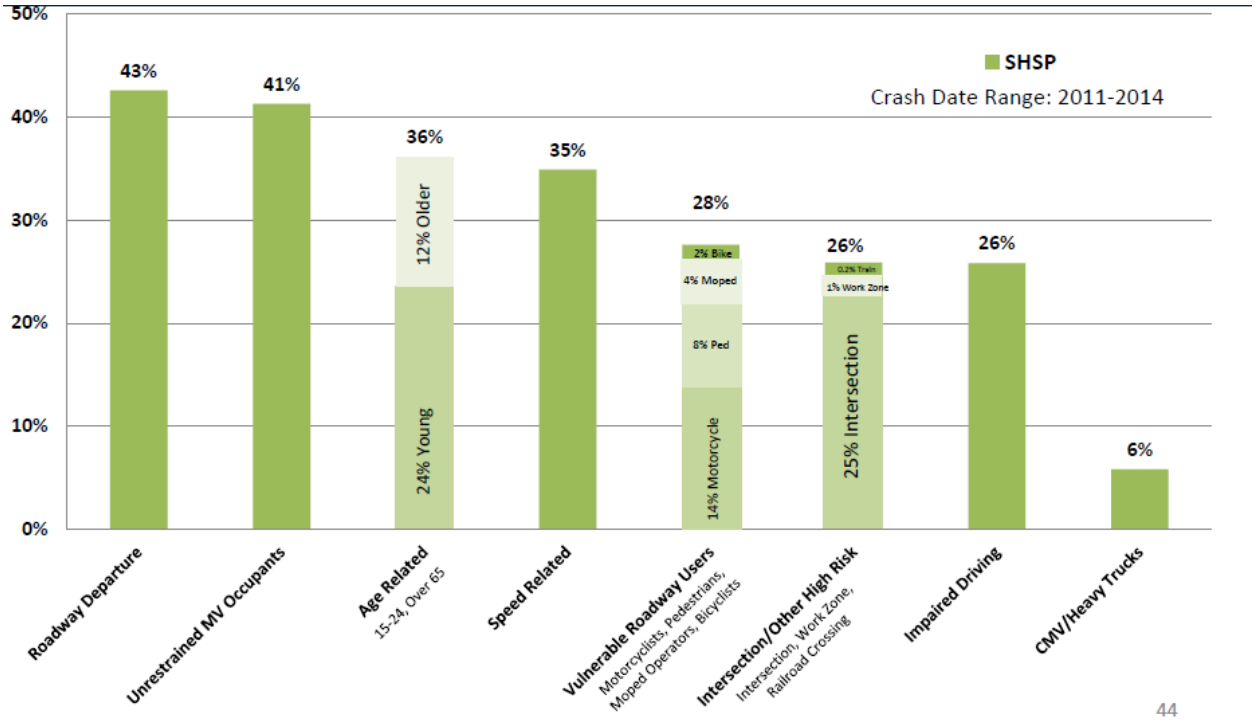


Strategic Highway Safety Plan (SHSP) Emphasis Area

SCDOT has categorized several areas that factor into crash data, such as age related, speed related, impaired driving etc. The chart below shows all the emphasis area that SCDOT categorized for the incident/accident analysis.

The summation of percentage on each category in the bar charts below exceeds 100% because each category may overlap with other category. The statistic shown represents ***statewide*** crash data from 2011 to 2014.

SHSP Emphasis Area

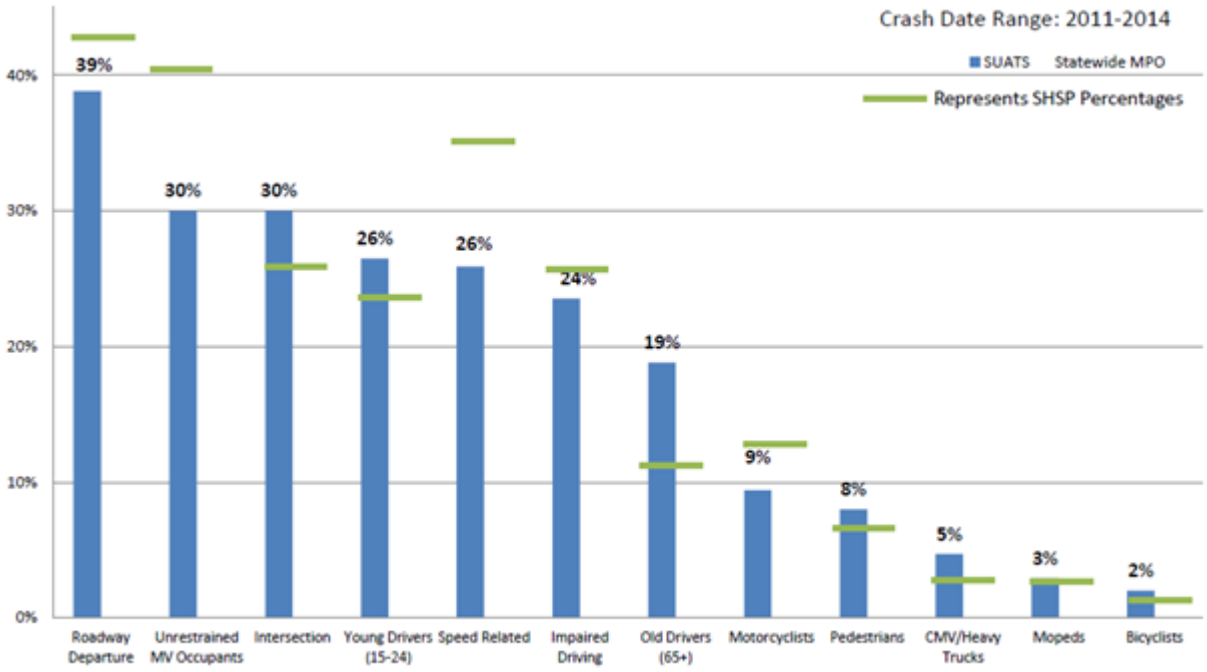


When the SUATS crash data is compared by each category with the statewide data, a number of categories draw attention include:

- SUATS unstrained MV occupants crash data is 11% lower than the statewide
- SUATS speed related accidents is 9% lower than the statewide
- SUATS Motorcyclist in accident is 5% lower than the statewide
- SUATS Old drivers (65+) involved with accident is 7% higher than the statewide
- SUATS Young drivers (15-24) 2% higher than the statewide
- SUATS Intersection accident is 5% higher than the statewide

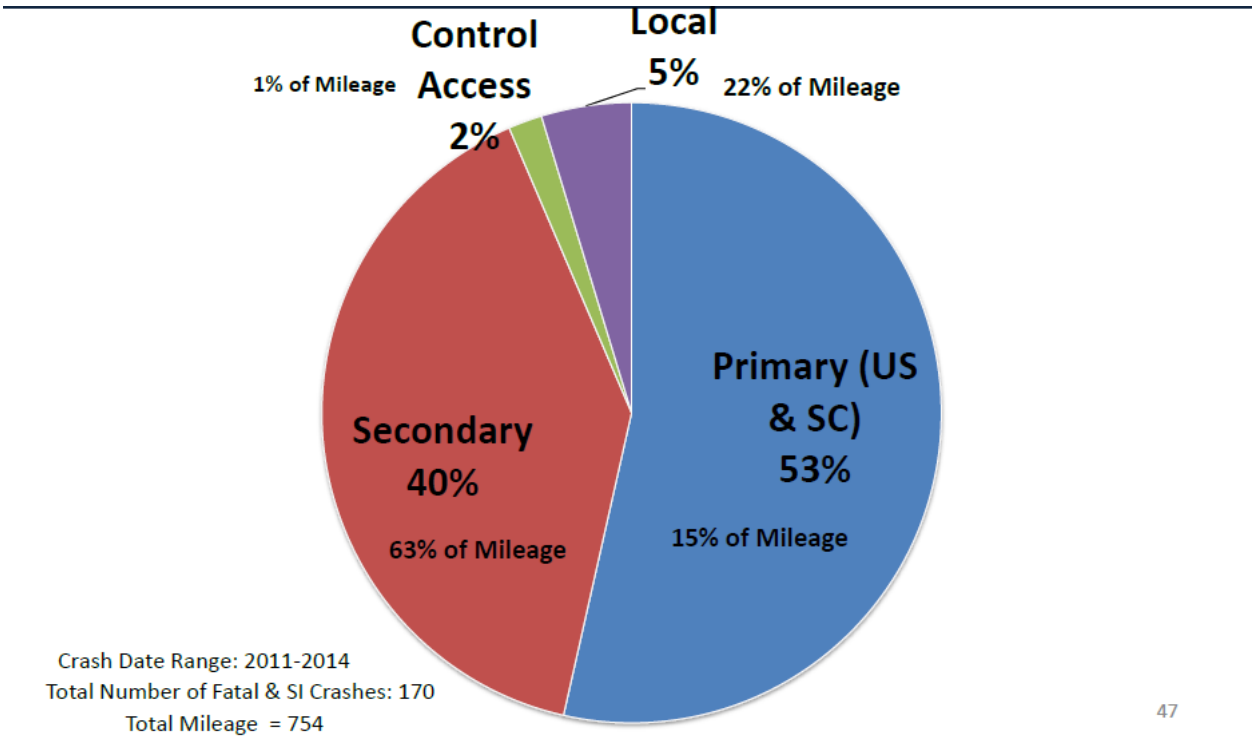
The bar charts below show the comparison between the SUATS statistic and the statewide data.

SUATS Fatal and Single Incident (SI) Crash Comparison



Roadway system within SUATS is measured for a total of 754 miles whereas the total number of fatal and SI crashes are 170 from 2011 to 2014. More than half of the crashes (53%) occurred on Primary Road (US Routes and SC state roads). However, these accidents cover merely 15% (113 mile of the 754 miles) of the total mileage. Accidents occurred at the access point such as driveways constitute the least number of crashes in 2% (7.54 mile of the total 754 miles)
The pie chart below reflects the breakdown of accidents occurred in SUATS in according to their roadway classifications.

SUATS Fatal and SI Analysis



Consistent with this pie chart, three corridors have been identified as “very high” crashes in Sumter:

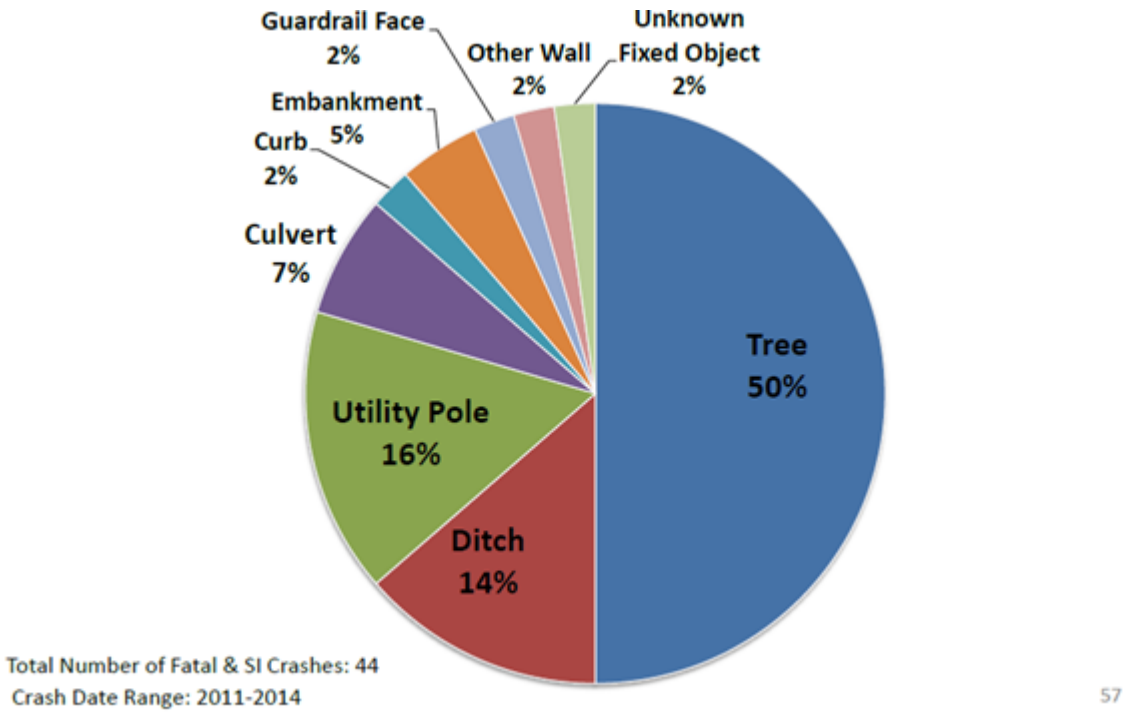
Primary Road--US 15 (**Lafayette/Pocalla Rd**)

Primary Road--SC 120 (**Alice Drive/Pinewood Rd**)

Secondary Road--Route 33 (**McCrays Mill Rd**)

The last bar chart has indicated 39% of crashes are Road Departure (**RD**) category. *Road Departure category has many facets, for example*, *vehicle accidents occurred related to speeding or drunk or hitting fixed objects etc.* 67% (44 vehicles out of the 66 vehicles crash in the RD category) of incidents within this Road Departure category is related to vehicles hitting fixed objects. The pie chart below delineates what type of fixed object involved in the incident.

Road Departure--Fixed Object Analysis



Alarmingly, 50% of the accidents involved collision with tree. Utility pole is the second highest. Ditch is the third.

SCDOT has proposed engineering countermeasure to fix the problem, it includes:

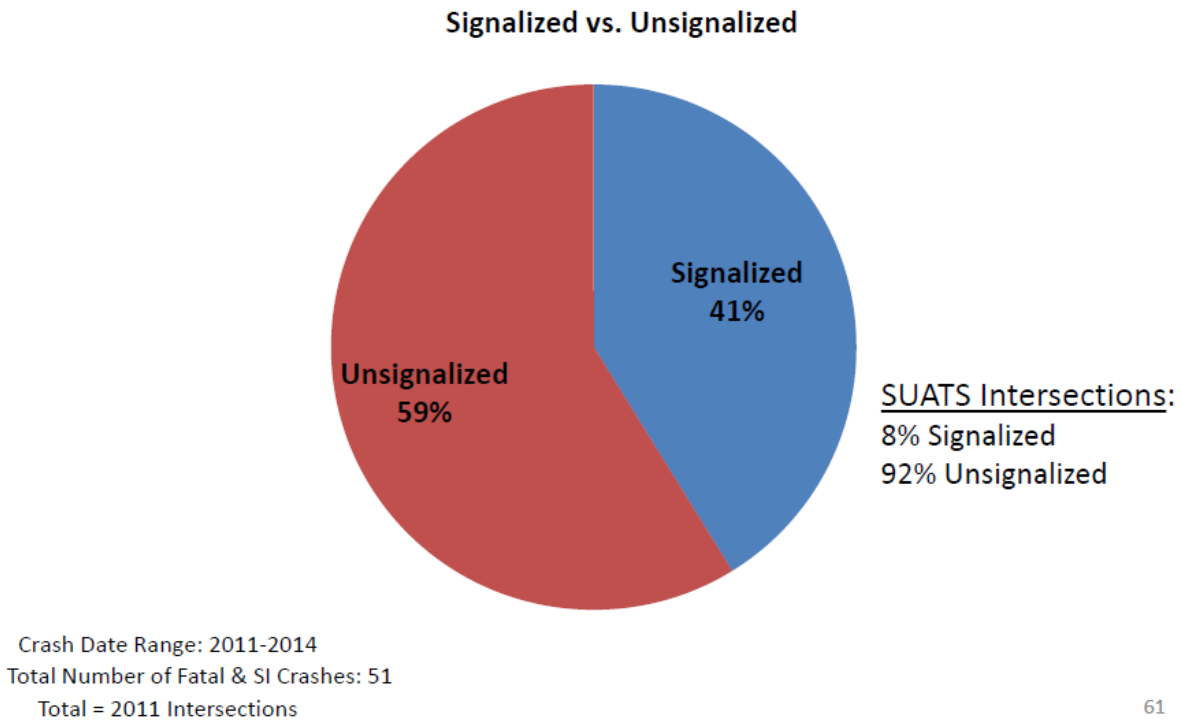
- Paved shoulders
- Rumble Strips
- Adequate Clear Zone
- Cable guardrail
- Pavement Friction
- Horizontal curve improvements (account for 25% of all fatalities nationally)

Intersection Analysis

As the previous bar chart indicated, 30% of incidents occurred in SUATS are involved at intersections*. SUATS has 5% more accidents than the statewide average*. Thus, it requires an analysis of this feature.

SUATS has a total of 2011 intersections in which 8% (161 out of 2011) is controlled by traffic signal lights and 92% (1850 out of 2011) is controlled by stop signs. The total number of fatal and single incident crashes during the study period is 51.

The data reveals 21 incidents of crashes occurred on signalized intersections and 30 incidents at unsignalized intersections. The pie chart below shows the percentage breakdown.



Consistent to the pie chart finding, 5 intersections have been identified as high accident locations, including one unsignalized and four signalized intersections.

8% of total intersection crashes occurred at N Main St and Old Whites Mill Rd (unsignalized intersection) while the other 4 signalized intersections had been counted 4% each.

The table below shows all 5 major intersection crashes covers 24% of all intersection crashes.

Intersection Analysis

		% Total Intersection Crashes
Sumter County US 15 & S-325	N. Main St. & Old Whites Mill Rd.	8%
Sumter County US 76 & SC 441	Broad St. & Patriot Pkwy.	4%
Sumter County US 521 & S-91	Thomas Sumter Hwy. & Frierson Rd.	4%
Sumter County SC 120 & S-33	Pinewood Rd. & McCrays Mill Rd.	4%
Sumter County SC 120 & S-1074	Alice Dr. & W. Wesmark Blvd.	4%

5 Intersection comprise 24% of all Intersection crashes

Total Number of Fatal & SI Crashes: 51
Crash Date Range: 2011-2014

63

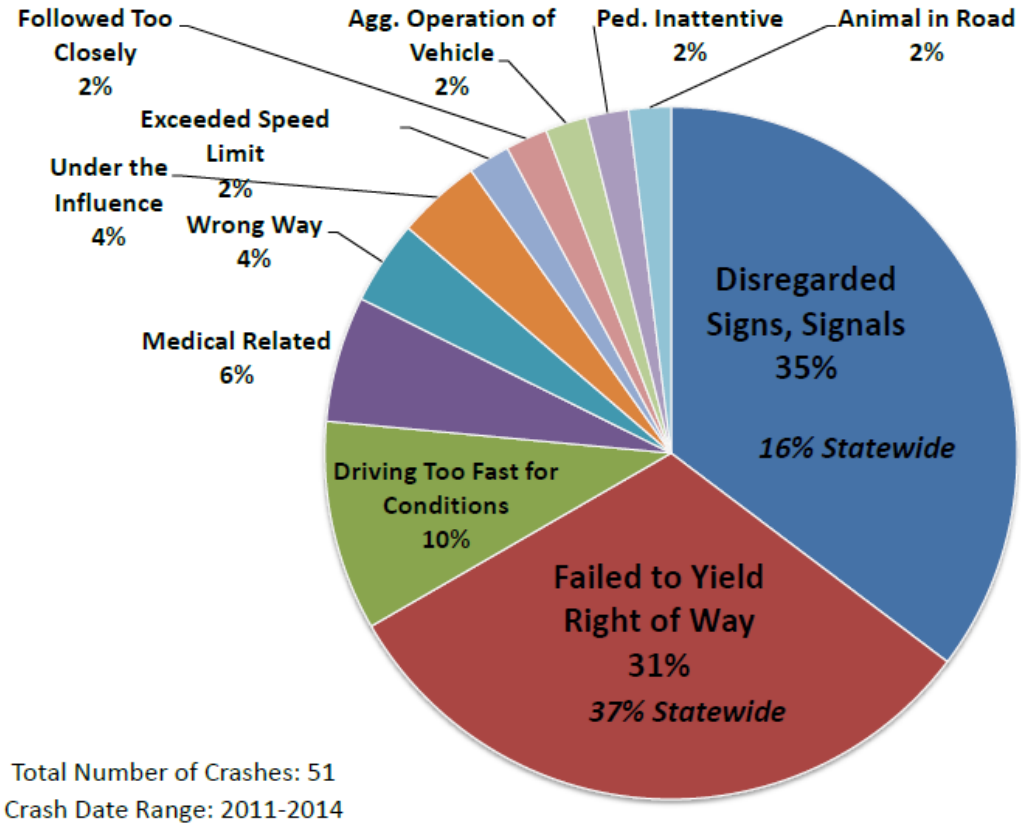
The statistics reveal the frequency of occurrences at these locations. To this end, the demanding question is what caused these accidents.

SCDOT had meticulously analyzed the probable cause of the accidents and listed 11 factors of the probable cause. The top four factors are:

Disregarded Signs, Signals (35%)
Failed to Yield Right of Way (31%)
Driving Too Fast For Conditions (10%)
Medical Related (6%)

They are shown in the pie chart below:

Intersection Probable Cause Analysis



Knowing the probable causes of accidents/incidents, SCDOT has developed 7 approaches to countermeasure the accidents/incidents. These approaches are all engineering oriented.

The list below shows the approaches and then an elaboration of a few approaches afterwards.

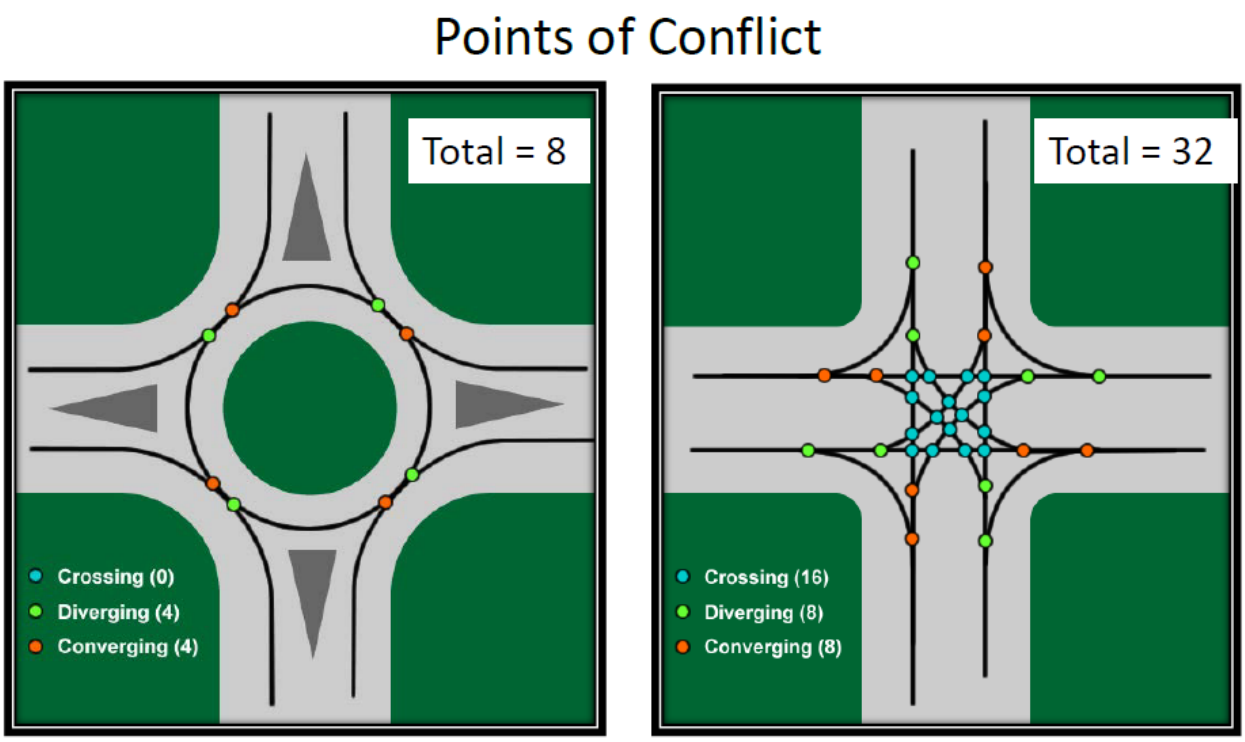
Intersection/Corridor Countermeasures

- Roundabouts
  - SCDOT Safety Office has completed 15 roundabouts
    - 71% reduction in total crashes,
    - 71% reduction in injury crashes
    - 100% reduction in fatal crashes
- Access Management (Concrete medians, RI/RO)
- Alternative Intersection Designs
  - R-CUT, Superstreet
- Adequate Sight Distance
- Traffic Signals
- Backplates with Retroreflective Borders
- Road Diets

Roundabouts

Columbus Circle in Manhattan, New York City built in 1904 is considered as the first model of Roundabout for modern days. For the past 20 years, many cities and states have replaced signalized intersections by roundabouts. The reason for such change is that Roundabouts reduce the number of crashes significantly than intersections (signalized and unsignalized). The engineering principle behind it is the number of conflict points for vehicles movements on a typical intersection is reduced from 32 to 8. The diagram below illustrates the location of conflicting points that created by two moving vehicles.

Roundabouts



Roundabouts are rather new features on roadway infrastructure in the past two decades. In Sumter three roundabouts are either already in use or under constructions. Located in Sumter these new features are:

SC120 (Pinewood Rd) and S-528 (Kolb Rd)
S-25 (Lewis Rd) and S-522 (Kingsbury Rd)
SC 763 (Wedgefield Rd) and S-507 (Pitts Rd)

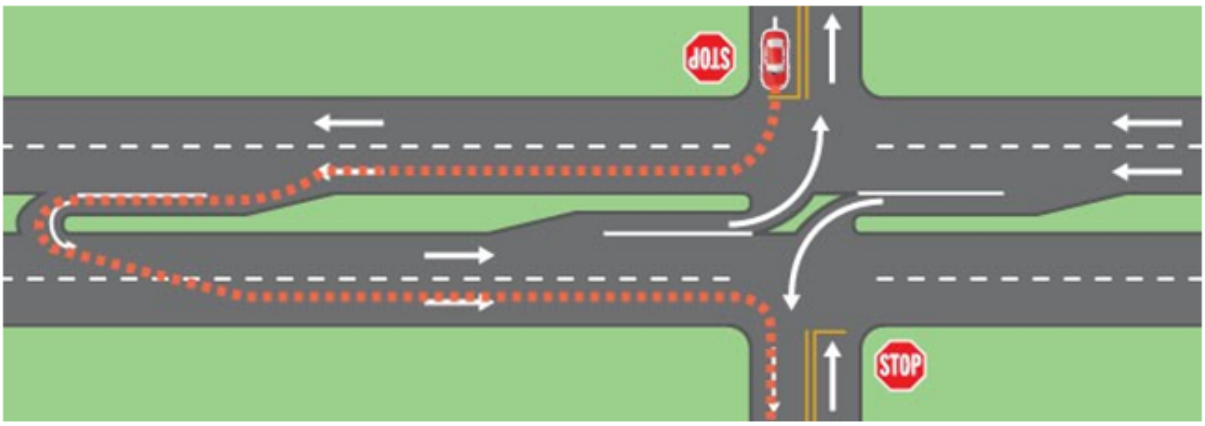
Majority of residents would not want to have a roundabout in their neighborhood since they have never experienced driving on roundabouts before. However, the SCDOT survey shows how they changed from their initial opinion of rejection to acceptance after they have experienced of using it. (See the table below)

Public Opinion on Roundabouts

Attitude	Before Construction	After Construction
• Very Negative	23%	00%
• Negative	45%	00%
• Neutral	18%	27%
• Positive	14%	41%
• Very Positive	0%	32%

Alternative Intersections Design (RCUT)

A relative new design known as Restricted Crossing U-Turn (RCUT) Intersection replaces the traditional intersection which has numerous permitted turning movements. As shown below, the RCUT restricts left turns at an intersection but allows the same movement in down stream via a U-turn.

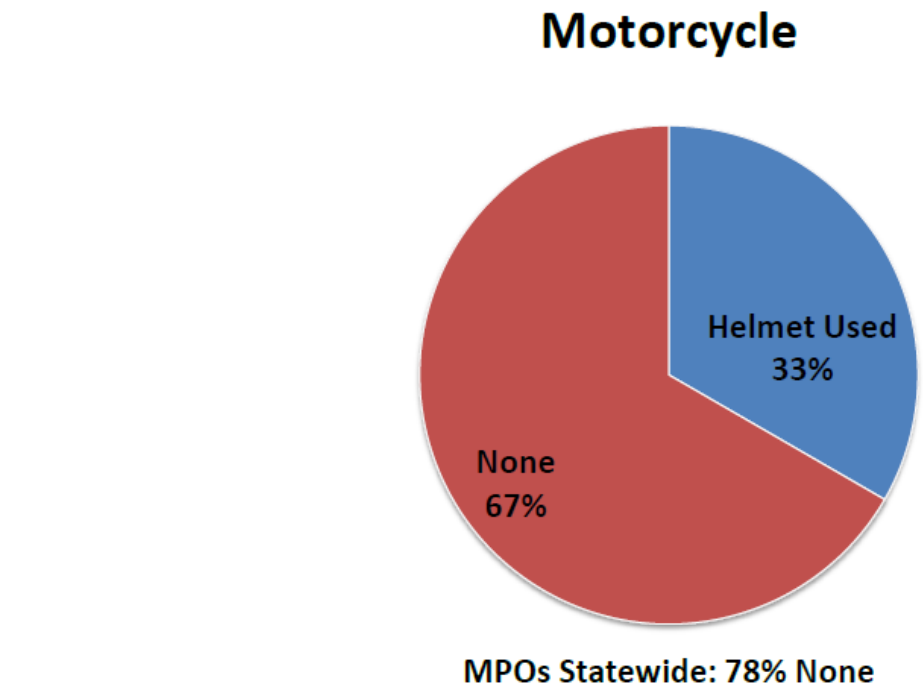


This design is usually suited for a combination of a major thoroughfare with higher traffic volume and the side street with lesser traffic volume. *SCDOT has implemented this alternative design in two locations in SC. In accordance with the SCDOT crash data after installation, 100% reduction in injury/fatal crashes and 75% reduction in total crashes.*

SCDOT has also provided a detail analysis of crashes related to motorcyclist and pedestrian.

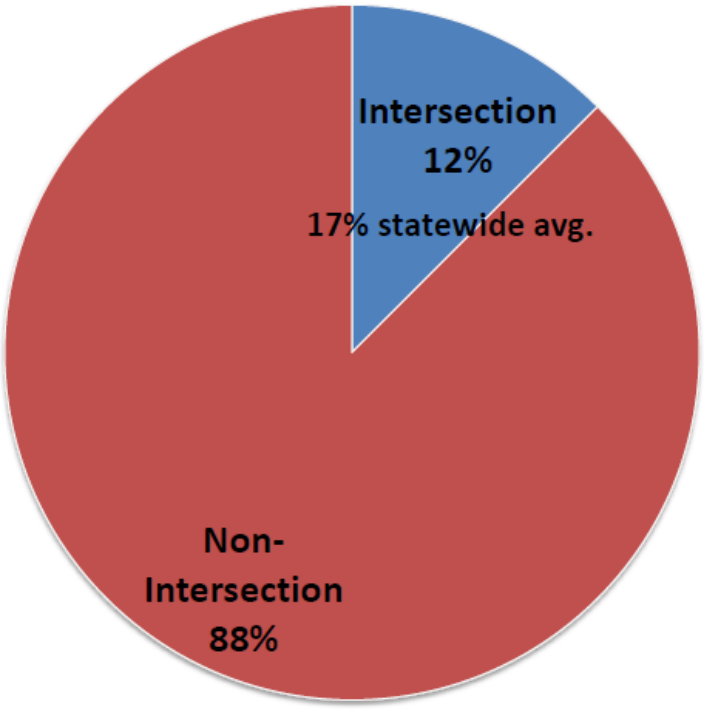
Motorcyclist—Helmet Analysis

The crash data related to Motorcyclists reveals majority of riders did not wear helmets in the crashes. However, compared with the statewide crash data, SUATS motorcycle riders have 9% lower than the statewide who do not wear helmet as shown below.



Pedestrian Analysis

During the study period from 2011 to 2014, there were 14 crashes involved with pedestrian. The data reveals that majority of the crashes occurred at the non-intersections. Only 2 pedestrian crashes took place at the intersection where 12 at non-intersection. The pie chart shows the percentage.



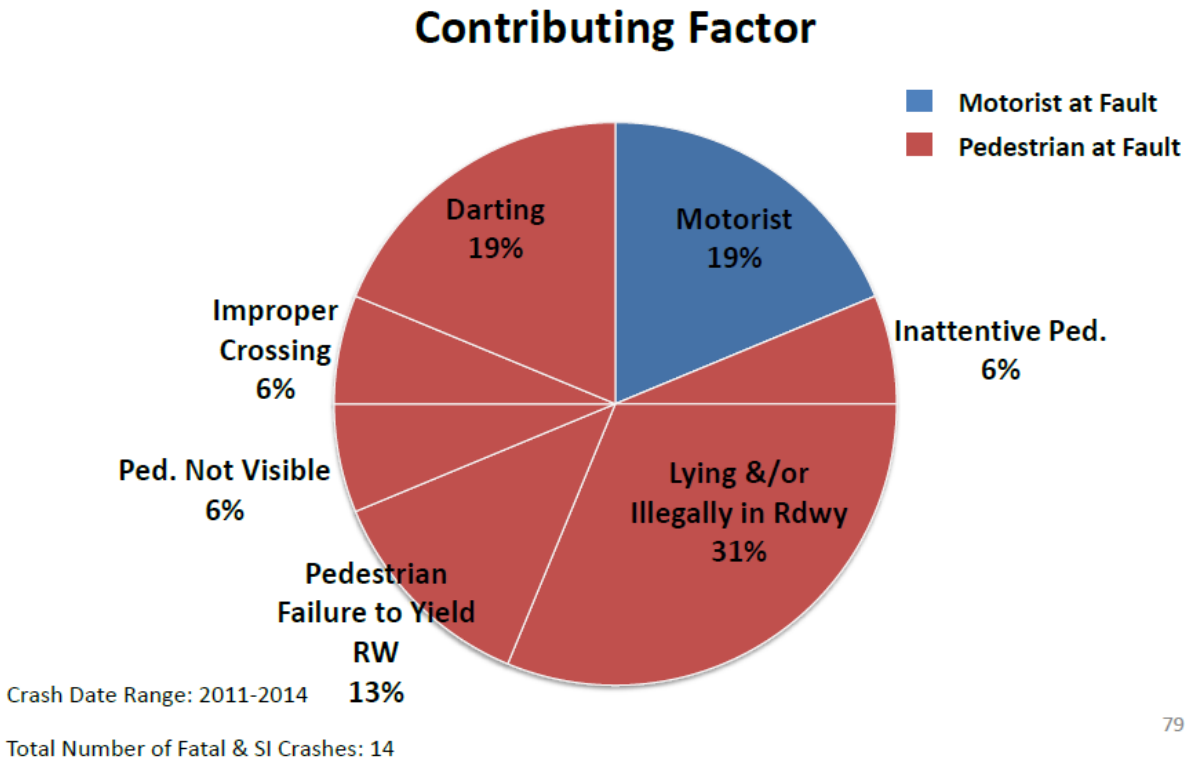
Total Number of Fatal & SI Crashes: 14
Crash Date Range: 2011-2014

Based upon these data, SCDOT found out the contributing factors for pedestrian accidents/crashes. Surprisingly, only 19% of the crashes were contributed to motorist's fault.

The top three contributing factors related to Pedestrian at fault are:

- Lying and/or illegally in Roadway (31%)
- Darting (19%)
- Pedestrian Failure to Yield Right of Way

The chart shows the detail of contributing factors.



Finally, SCDOT produces a Safety Performance Measures Comparison. The table below shows the Statewide number which is included within the boundary of SC regardless of local jurisdictions division, MPOs is the all 11 Metropolitan Planning Organizations (MPOs) jurisdictions, and SUATS is the Sumter jurisdiction.

The fatality rate in SUATS has improved since 2012 when compared with the statewide. Also, since 2013 SUATS fatality rate has improved when compared with other MPOs.

Safety Performance Measures Comparison

	Total Fatalities			Fatality Rate		
	Statewide	MPOs	SUATS (% of MPO)	Statewide	MPOs	SUATS (% diff. MPO)
2011	833	324	14 (4%)	1.700	1.238	2.24 (+45%)
2012	873	361	10 (3%)	1.782	1.379	1.60 (+14%)
2013	763	357	8 (2%)	1.558	1.364	1.28 (-6%)
2014	823	376	9 (2%)	1.68	1.536	1.44 (+24%)
2015	977	451	11 (2%)	1.89		

Conclusion

SCDOT has meticulously analyzed all the accident reports occurred between 2011 and 2014 within SUATS boundary. Several crash data features can be highlighted below:

- SUATS unstrained MV occupants crash data is 11% lower than the statewide
- SUATS speed related accidents is 9% lower than the statewide
- SUATS Motorcyclist in accident is 5% lower than the statewide
- SUATS Old drivers (65+) involved with accident is 7% higher than the statewide
- SUATS Young drivers (15-24) 2% higher than the statewide
- SUATS Intersection accident is 5% higher than the statewide
- The top 3 probable cause of incidents 1.Disregarded Signs, Signals 2. Failed to Yield Right of Way 3. Driving Too Fast For Conditions
- For one car accident/incident involved with fixed object: 50% Tree
- Only one third of motorcycle incidents, riders would wear helmet.

- 81% Incidents involving with pedestrian were at fault.
- Safety Performance Measures in SUATS has been outdoing the Statewide since 2012.